



(12) **United States Patent**
Kleemeier et al.

(10) **Patent No.:** **US 9,543,397 B2**
(45) **Date of Patent:** **Jan. 10, 2017**

(54) **BACKSIDE SOURCE-DRAIN CONTACT FOR INTEGRATED CIRCUIT TRANSISTOR DEVICES AND METHOD OF MAKING SAME**

29/41733 (2013.01); *H01L 29/4975* (2013.01);
H01L 29/78603 (2013.01); *H01L 29/78648*
(2013.01)

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(58) **Field of Classification Search**
CPC *H01L 29/41733*; *H01L 29/78648*
USPC 438/155
See application file for complete search history.

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(21) Appl. No.: **14/931,078**

(22) Filed: **Nov. 3, 2015**

Primary Examiner — Anthony Ho

(65) **Prior Publication Data**

US 2016/0056249 A1 Feb. 25, 2016

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Related U.S. Application Data

(62) Division of application No. 14/298,000, filed on Jun. 6, 2014, now Pat. No. 9,209,305.

(57) **ABSTRACT**

(51) **Int. Cl.**

H01L 21/00 (2006.01)
H01L 29/417 (2006.01)
H01L 29/786 (2006.01)
H01L 27/12 (2006.01)
H01L 21/84 (2006.01)
H01L 29/49 (2006.01)

An integrated circuit transistor is formed on and in a substrate. A trench in the substrate is at least partially filled with a metal material to form a source (or drain) contact buried in the substrate. The substrate further includes a source (or drain) region epitaxially grown above the source (or drain) contact. The substrate further includes a channel region adjacent to the source (or drain) region. A gate dielectric is provided on top of the channel region and a gate electrode is provided on top of the gate dielectric. The substrate is preferably of the silicon on insulator (SOI) type.

(52) **U.S. Cl.**

CPC *H01L 29/41766* (2013.01); *H01L 21/84* (2013.01); *H01L 27/1203* (2013.01); *H01L*

23 Claims, 23 Drawing Sheets

